

A Taxonomic Revision of *Cheirostylis* (Orchidaceae) in Australia

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Abstract

The genus *Cheirostylis* in Australia is revised. Two species are recognised, *C. ovata* (F.M. Bailey) Schltr. and *C. notialis* D.L. Jones sp. nov. *Cheirostylis ovata* has ovate-lanceolate leaves to 50 mm long and 20 mm wide, with a pale median band, freely opening, entogamous flowers to 14 mm long and 10 mm wide, and a functional viscidium. *Cheirostylis notialis* has uniformly green, ovate leaves to 35 mm long and 20 mm wide, cleistogamous or rarely opening, autogamous flowers to 9 mm long and 6 mm wide, and a non-functional viscidium.

Introduction

The genus *Cheirostylis* was described by Blume (1825) based on a single species, *C. montana* Blume, from mountains near Tjanjor in the Parang Province, western Java. Subsequently more than 20 species have been described from regions as diverse as Africa, Asia, South-east Asia, Polynesia, Malesia and Australia.

Cheirostylis belongs in the subtribe Goodyerinae, which includes an assemblage of autotrophic or saprophytic taxa with a terrestrial or epiphytic growth habit. Generic delimitations are not always clear in the subtribe as evidenced by the placement of *C. ovata* (F.M. Bailey) Schltr. in two different genera (Bailey 1896; Schlechter 1911–14) and a synonym being described in *Zeuxine* (Rogers and White 1921). *Cheirostylis* is however distinctive and it belongs in an alliance of genera which have two, well separated stigmata. Overall *Cheirostylis* shares many characters with *Zeuxine* Lindley, but can be distinguished by the absence of roots on the fleshy rhizome, these being replaced by ventral ridges from which masses of rhizoids arise; the sepals being connate basally with the lateral sepals united to form a synsepalum; and, the labellum lamina being deeply divided into two dentate lobes.

The distinctions between some taxa in *Cheirostylis* remain unresolved. No monograph of the genus has been attempted, herbarium material is scanty and often poor, and the circumscriptions of many of the named taxa are brief and unsatisfactory. In Australia one species of *Cheirostylis* is commonly recognised, namely *C. ovata* (Dockrill 1969; Rupp 1969; Clements 1989; Stanley and Ross 1989; Dockrill 1992; Weston 1993), although Maiden and Betche (1896) erroneously recorded *C. grandiflora* Blume as occurring in northern New South Wales. This species, based on a specimen collected by Zippelius in Dutch New Guinea (Blume 1825), is endemic to New Guinea. Maiden and Betche's identification was based on a 'plant collected by Dr W. Finselbach on rocky hills, in a shady locality in the dense scrub on the Richmond River, near Lismore'. Maiden and Betche suggested that this species was 'perhaps identical with *Gastrodia*

ovata F.M. Bailey' and in the same paper provided an abbreviated translation of Blume's original description of *C. grandiflora*. The species previously confused by Maiden and Betche with *C. grandiflora*, is described here as new.

Cheirostylis also occurs in countries adjacent to Australia, namely Java (Comber 1990), New Guinea (Blume 1825; Schlechter 1911–14), and New Caledonia (Hallé 1977). As deduced from available descriptions, drawings, specimens and photographs, the taxa occurring in these regions are distinct from the Australian species.

Methods

This revision is based on my field collections, specimens collected by field operatives and the examination of herbarium specimens at AD, BRI, L, MEL, NSW and QRS. Floral descriptions are based on fresh specimens or spirit-preserved material.

Description of Genus

Cheirostylis Blume, *Bijdr.* 6: t. 1 fig.1b; 8: 413 (1825). *Type: Cheirostylis montana* Blume.

Epiphytic, epilithic or terrestrial herbs growing singly or in small, loose groups. *Rhizome* prostrate to decumbent, fleshy, irregularly swollen at the internodes, constricted at the nodes, with dense clusters of short, white rhizoids arising ventrally from points of contact with rocks and leaves. *Stem* apical, erect, short. *Leaves* simple, entire, thin-textured, spirally arranged in a loose rosette, often withered at anthesis, petiolate; venation reticulate; petiole sheathing at the base. *Inflorescence* a few-flowered terminal raceme; scape and rachis hairy. *Flowers* small, white, hairy. *Sepals* connate basally, the lateral sepals forming a synsepalum. *Petals* free. *Labellum* lamina bilobed, the narrow base developed into a shallow sac containing calli. *Callus* elongate, with or without apical swellings. *Column* small, with elongate stigmatic arms and rostellum. *Anther* dorsal. *Pollinia* 4, elongate, attached to an elongate stipe.

Etymology

(Greek) *cheir* = hand, *stylis* = style; in reference to the lobed apical margins of the clinandrium which resemble a hand.

Taxonomic History

Cheirostylis was first recorded from Australia by Maiden and Betche (1896) who wrongly identified material collected in northern New South Wales as *C. grandiflora* Blume (see introduction). Bailey (1896) described *Gastrodia ovata* from near Cairns, and Schlechter (1911), realising its erroneous generic placement, transferred it to *Cheirostylis*. In the same year *Zeuxine attenuata* was described from specimens collected near Mackay (Rogers and White 1921). *Zeuxine attenuata* is a taxonomic synonym of *Cheirostylis ovata*.

Key to Australian species of *Cheirostylis*

1. Leaf dark green with a pale median band, flowers opening freely, 10–14 mm long1. *C. ovata*
1. Leaf uniformly dark green, flowers mostly cleistogamous, 5–9 mm long.....2. *C. notialis*

1. *Cheirostylis ovata* (F.M. Bailey) Schltr., *Bot. Jahrb. Syst.* 45: 394, in obs. (1911); *Gastrodia ovata* F.M. Bailey, *Bot. Bull. Dept. Agric. Queensland* 14: 13 (1896). *Type*: Queensland, Mountain Ra., near Cairns, L.J. Nugent (holotype BRI, not found); Queensland, Russell River, below the First Combo, R.L. Jago 466, 23.viii.1981 (neotype here selected, QRS 65146).

Zeuxine attenuata R.S. Rogers & C.T. White, *Proc. Roy. Soc. Queensland* 32: 123–4, fig. 2 (1921). *Type*: Queensland, Mackay, 13.ix.1895, L.J. Nugent (holo BRI!).

Illustration: Lavarack and Gray, *Australian Tropical Orchids* 14, top plate (1992).

Rhizome 4–10 mm in diameter. *Stem* 1–2 mm in diameter. *Leaves* 4–7; petioles 5–12 mm long, 2–3 mm wide, channelled, sheathing at the base; lamina ovate-lanceolate, 25–50 mm long, 12–20 mm wide, dark green, dull, with a light band along the midrib, apex acute to acuminate. *Inflorescence* 10–25 cm tall, slender, 1–6-flowered. *Sterile bracts* 3 or 4, ovate-lanceolate, 13–21 mm long, 5–6 mm wide, closely sheathing, acuminate. *Fertile bracts* ovate-lanceolate, 5–15 mm long, 3–5 mm wide, closely sheathing, acuminate. *Pedicels* 3–10 mm long, slender, semi-erect, hairy. *Ovaries* narrowly obovoid, 4–8 mm long, 2–4 mm wide, constricted near the apex. *Flowers* white, 10–14 mm long, 9–10 mm wide. *Dorsal sepal* ovate-lanceolate, 7–8 mm long, 4–4.5 mm wide, porrect proximally where connate with the lateral sepals, erect to suberect in the distal half, apex obtuse. *Synsepalum* 7–8 mm long, 4.5–5 mm wide, porrect, the lobes obtuse, divaricate, c. 3 mm apart at the tips. *Petals* narrowly linear-oblong, 7–8 mm long, 2–2.5 mm wide, slightly falcate, obliquely erect, divergent, apex obtuse. *Labellum* porrect to obliquely deflexed, 12.5–14 mm long, c. 9 mm wide; labellum base 5–5.5 mm long, 2.5–2.8 mm wide, channelled, base saccate, bearing 1–3, irregularly lobed calli, c. 1 mm long; lamina deeply bilobed, each lobe more or less oblong-cuneate, 5–6 mm long, 3–4.5 mm wide, divergent, 5–6 mm apart at the apex, the anterior margins irregularly lobed, all margins minutely denticulate. *Callus* elongate, with two small, apical swellings. *Column* 4.5–5 mm long, c. 2.5 mm wide. *Stigma arms* c. 3.5 mm long, obliquely erect to porrect. *Rostellum* elongate. *Anther* ovate, c. 1.3 mm long, c. 1.5 mm wide, brown, with a slender rostrum. *Pollinarium* c. 3.5 mm long; viscidium elliptic, 0.7 mm long; stipe ligulate, c. 10 mm long; pollinia linear clavate, 1.5–1.8 mm long, white, mealy. *Capsules* narrowly obovoid, 7–10 mm long, 4–5 mm wide, suberect to erect. (Fig. 1)

Distribution

Endemic to north-eastern and central-eastern Queensland (Iron Range to Eungella) (Fig. 2).

Ecology

Commonly grows among rocks in monsoonal rainforest and vine thickets. The plants are regularly covered by fallen leaves throughout the year, but especially when the forest trees shed their leaves during the late dry season. At this time the orchid plants are dormant, surviving as the fleshy rhizome which becomes completely covered by leaves and other litter. The new shoots of the orchid grow up through this layer and the fine root hairs produced from the ventral swellings on the rhizome become attached to the decaying leaves and other litter as well as rocks. Altitude range 20–750 m. Flowering period August–October.

Recognition

Differs from *C. notialis* by its larger (to 50 mm long and 20 mm wide), ovate-lanceolate leaves which have a pale band along the midrib; larger (to 14 mm long and 10 mm wide) flowers which open freely, with the perianth tips spreading and recurving;

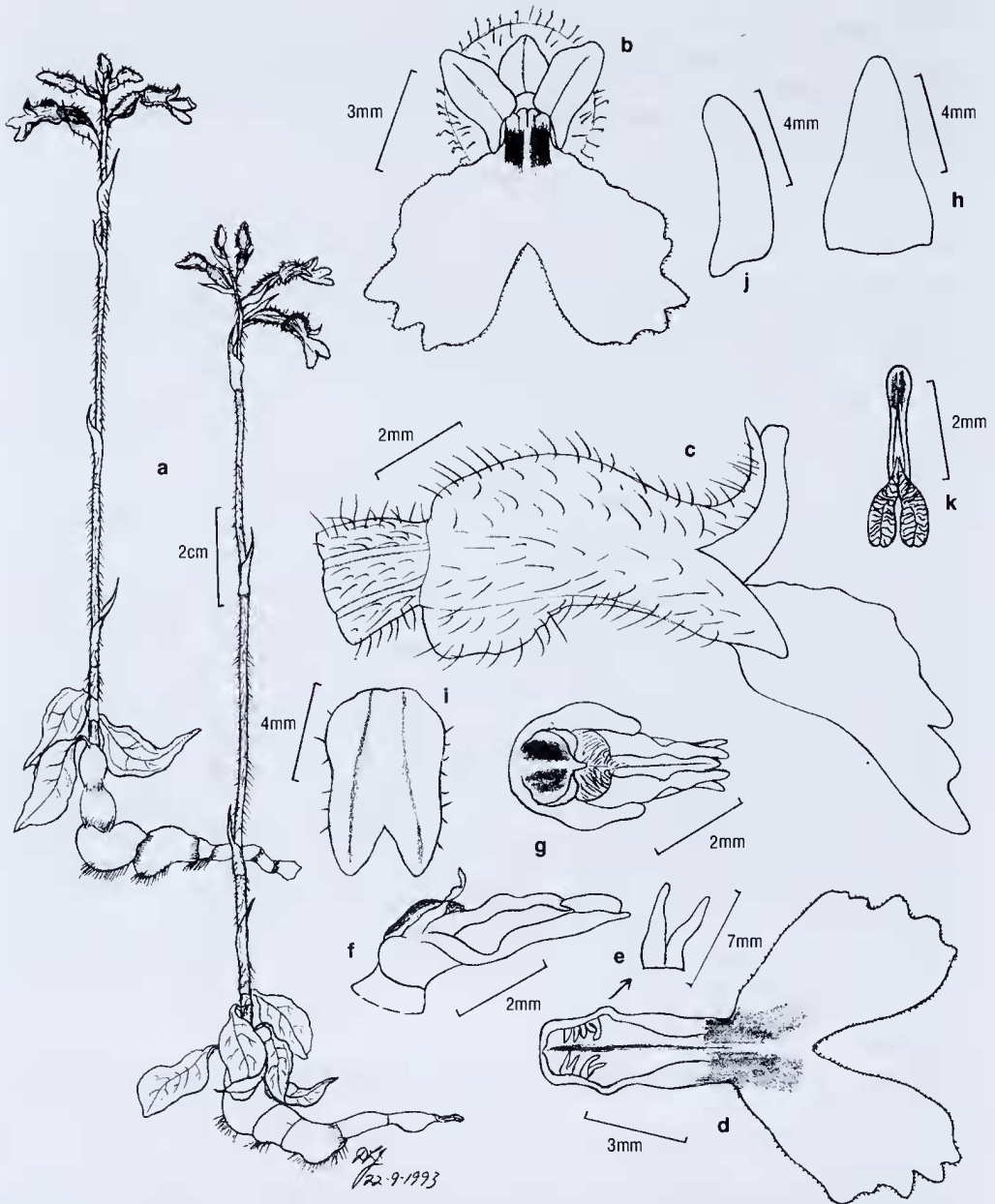


Fig. 1. *Cheirostylis ovata* (Broers 412; CANB): a plants showing habit; b flower from front; c flower from side; d labellum from above, flattened out; e labellum calli; f column from side; g column from above; h dorsal sepal; i synsepalum; j petal; k pollinarium.

larger perianth parts (dorsal sepal 8 mm long, 4.5 mm wide; synsepalum 8 mm long, 5 mm wide; petals 8 mm long, 2.5 mm wide; labellum 12.5 mm long, 9 mm wide); and, a larger (3.5 mm long) pollinarium with a functional viscidium.

Typification

No type material of *C. ovata* could be found at BRI by either Clements (1989) or myself, and a neotype has therefore been selected using a flowering specimen from a locality close to that of the original collection.

Notes

Rogers and White (1921) described *Zeuxine attenuata* from fragmentary material which lacked a rhizome. Had the specimen been more complete its generic placement would probably have been more obvious to the authors.

As deduced from the floral morphology, well-developed sticky viscidium on the pollinarium and proportion of flowers which set capsules, *C. ovata* is entomogamous but details of the pollinating vector remain unknown.

Etymology

(Latin) *ovatus* = ovate; probably in reference to the ovate leaf lamina.

Specimens Examined

QUEENSLAND: False Moochoopa Ck, upstream of Pack Trail, *Bostock 1488*, 17.ix.1993 (BRI 629409); Upper Parrot Ck, Annan River, *Brass*, 15.ix.1948 (BRI 70113), *Brass*, 19.ix.1948 (BRI 70112); Freshwater Ck, Cairns, *Flecker*, 25.viii.1935 (QRS 44057); Mt Tozer, *Gray 5113*, 16.ix.1989 (QRS 92282); TR 146, Tableland LA, *Gray 1795*, 11.ix.1980 (QRS 61654); Tozers Gap, *Gray 5710*, 29.viii.1993 (QRS 102309); McIlwraith Ra., *Hyland 7626*, 20.ix.1974 (QRS 44059); Layland Holding, Hann Tableland, *Hyland 14741*, 30.iii.1993 (QRS 101747); Lamb Ra., *Johnson*, 16.x.1949 (QRS 44058); Puffdlooney Hill, Iron Ra., *Lavarack*, 8.ix.1975 (BRI 193378); Tozers Gap, *Lavarack 1021*, ix.1976 (BRI 193379); Mackay, *Nugent*, 13.ix.1895 (BRI 312027); Shiptons Flat, near Cooktown, *Roberts (Jones 12980)*, ix.1994 (CBG 9517131 in CANB); mountain NE of Pascoe R. crossing, *Wrigley 210*, 5.ix.1976 (CBG 67961 in CANB); Tozers Gap, Janet Ra., *Wrigley 266*, 7.ix.1976 (CBG 67758 in CANB).

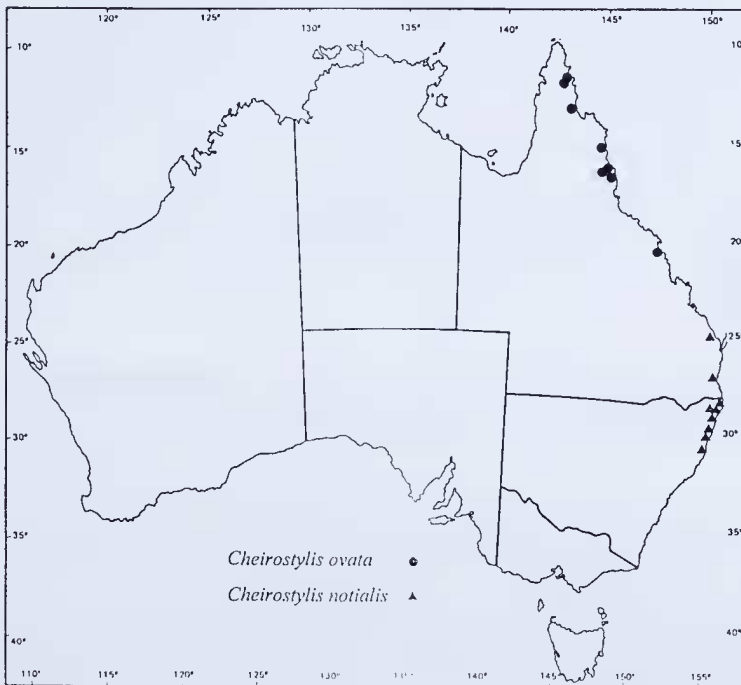


Fig. 2. Distribution of *Cheirostylis* in Australia.

2. *Cheirostylis notialis* D.L. Jones, sp. nov.

Affinis *C. ovatae* (F.M. Bailey) Schltr., foliis minoribus (usque 35 mm × 20 mm) plus distincte ovatis vitta pallida secus nervum medium carenti, ovario trichomatibus in costis praecipue, floribus minoribus (usque 9 mm × 6 mm) plerumque cleistogamis vel si chasmogamis periantho segmentis porrectis remanentibus apici non recurvatis, periantho partibus minoribus (sepalo dorsali 6 mm × 4 mm, synsepali 6 mm × 4.5 mm, petalis 6 mm × 2 mm, labello 8.5 mm × 7 mm), et pollinario minore (2.5 mm longo) viscidio non fungenti differt.

Type: New South Wales, Broken Head, Jones, 15.x.1987 (holotype CANB).

Cheirostylis grandiflora sensu J.H. Maiden & E. Betche, *Proc. Linn. Soc. New South Wales* 21: 624–7 (1896), non Blume (1825).

Illustrations (both as *C. ovata*): T.D. Stanley and E.M. Ross, *Fl. South-eastern Queensland* 3: 369, fig. 55H (1989); P. Weston, *Fl. New South Wales* 4: pl. 15, bottom centre (1993).

Rhizome 4–11 mm in diameter. *Stem* 1–2 mm in diameter. *Leaves* 3–6; petioles 3–10 mm long, 2–3 mm wide, channelled, sheathing at the base; lamina ovate to ovate-lanceolate, 13–35 mm long, 9–20 mm wide, dark green, dull, apex acute to acuminate. *Inflorescence* 5–18 cm tall, slender, 1–4-flowered. *Sterile bracts* 3 or 4, ovate-lanceolate, 10–16 mm long, 4–5 mm wide, closely sheathing, acuminate. *Fertile bracts* ovate-lanceolate, 3–11 mm long, 3–4 mm wide, closely sheathing, acuminate. *Pedicels* 2–5 mm long, slender, semi-erect, hairy. *Ovaries* narrowly obovoid, 4–8 mm long, 2–4 mm wide, constricted near the apex. *Flowers* white, 6–9 mm long, 5–6 mm wide, often cleistogamous. *Dorsal sepal* ovate, 5–6 mm long, 3.5–4 mm wide, porrect throughout, apex obtuse. *Synsepalum* 5–6 mm long, 4.3–4.5 mm wide, porrect, the lobes obtuse, divaricate, c. 2 mm apart at the tips. *Petals* narrowly linear-oblong to narrowly oblong-obovate, 5–6 mm long, 1.8–2 mm wide, slightly falcate, porrect, slightly divergent, apex obtuse. *Labellum* porrect to obliquely deflexed, often partially twisted, c. 8.5 mm long, c. 7 mm wide; labellum base 4–4.5 mm long, 1.5–2 mm wide, channelled, base saccate, bearing 1–3, irregularly lobed calli, c. 1 mm long; lamina deeply bilobed, each lobe more or less oblong-cuneate, 3–4.5 mm long, 2.6–3 mm wide, divergent, 2–3 mm apart at the apex, the anterior margins irregularly lobed, all margins minutely denticulate. *Callus* elongate. *Column* 3–3.5 mm long, c. 1.8 mm wide. *Stigma arms* c. 2.3 mm long, porrect. Rostellum elongate. *Anther* ovate, c. 1 mm long, c. 1 mm wide, brown, with a short rostrum. *Pollinarium* c. 2.5 mm long; viscidium elliptic, 0.5 mm long; stipe ligulate, c. 9 mm long; pollinia linear clavate, 1–1.3 mm long, white, mealy. Capsules narrowly obovoid, 7–10 mm long, 4–5 mm wide, suberect to erect. (Fig. 3)

Distribution

South-eastern Queensland and north-eastern New South Wales (Miriam Vale to Grassy Head) (Fig. 2).

Ecology

Grows in shady, often moist areas under shrubs in littoral rainforest, rainforest margins and wet sclerophyll forest. Soils are commonly sandy loams, less commonly clay loams. Altitude sea level to 350 m. Flowering period October and November.

Recognition

Differs from *C. ovata* by its smaller (to 35 mm long, 20 mm wide), more distinctly ovate leaves which lack any pale band along the midrib; smaller (to 9 mm long, 6 mm

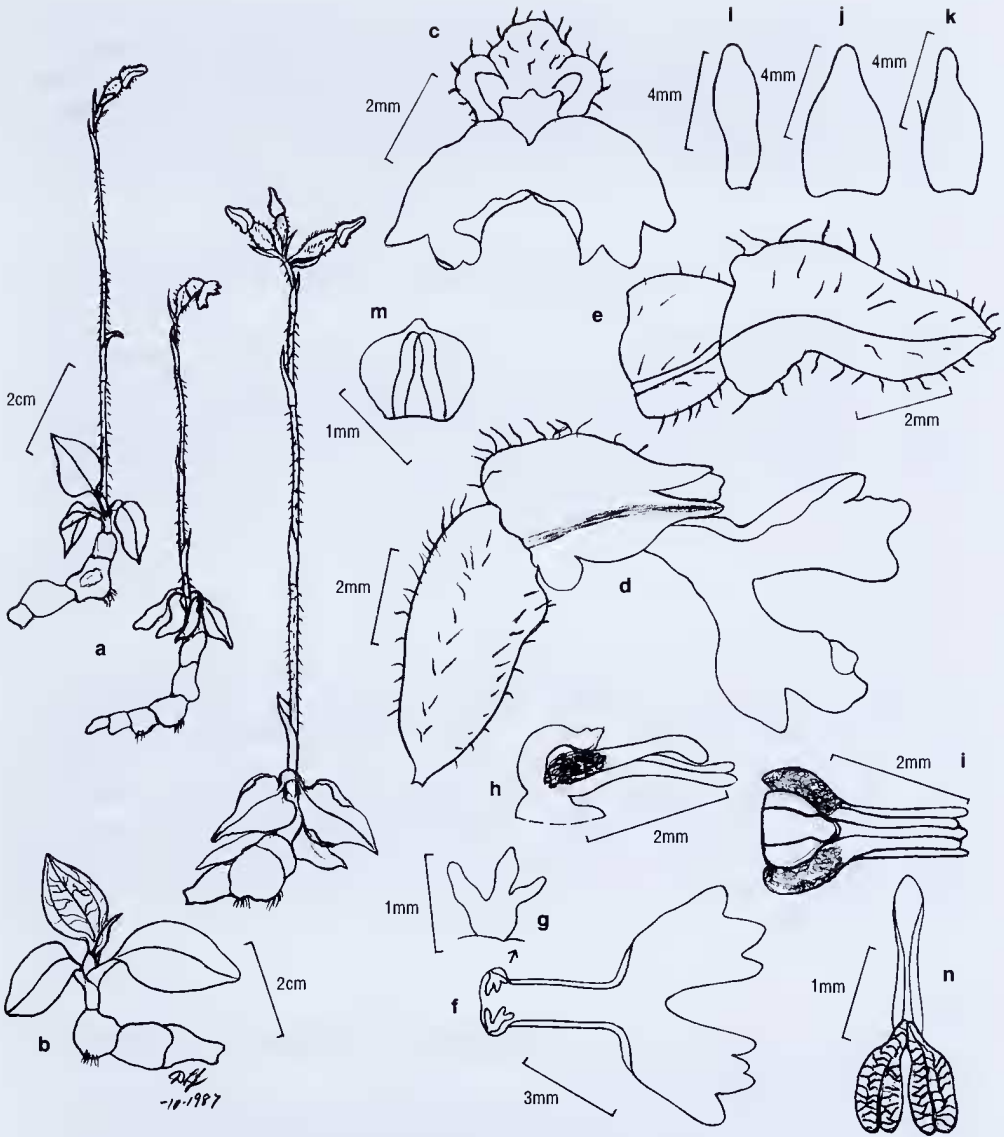


Fig. 3. *Cheirostylis notialis* (Broken Head, Jones s.n.; CANB): a plants showing habit; b non-flowering plant; c flower from front; d open flower from side; e cleistogamous flower from side; f labellum from above, flattened out; g labellum calli; h column from side; i column from above; j dorsal sepal; k lateral sepal; l petal; m anther, ventral view; n pollinarium.

wide) flowers which are commonly cleistogamous or if they open then the perianth segments remaining correct, with the tips not recurving; smaller perianth parts (dorsal sepal 6 mm long, 4 mm wide); synsepalum 6 mm long, 4.5 mm wide; petals 6 mm long, 2 mm wide; labellum 8.5 mm long, 7 mm wide); and, a smaller (2.5 mm long) pollinarium with a non-functional viscidium.

Notes

The flowers of this species are commonly cleistogamous, with autogamy occurring as the buds develop. In occasional flowers the perianth parts may partially expand, with the labellum protruding, but the sepals do not separate widely and the petals usually remain enclosed within the dorsal sepal. In the few flowers that do open, the labellum is often partially twisted to one side.

Etymology

(Latin) *notialis* = southern; in reference to the southerly distribution of this species.

Specimens Examined

QUEENSLAND: Meres Rd, Bellthorpe, *Crane 991*, 12.xi.1993 (BRI 622463, CANB); Bulburin SF, near Miriam Vale, *Jansen*, 20.xi.1994 (BRI 581822, NSW). NEW SOUTH WALES: 2 km N of Wardell, *Bishop J95/12-18*, 27.ix.1989 (NSW); Woody Head, *Blaxell*, 30.iii.1976 (NSW); Red Rock, N of Woolgoolga, *Clemesha*, 11.iv.1976 (NSW); Brunswick Heads, *Coveny 4380*, 1.ix.1972 (NSW); Lismore, *Fuisellback*, xi.1896 (NSW); near Brunswick Heads, *Hoogland 8599 and Hayes*, 26.x.1962 (NSW); Brunswick Heads, *Hunt*, x.1960 (BRI 435836); Broken Head, *Jones*, 7.xiii.1987 (CANB); 2 km N of Grassy Head, *Metcalf*, vii.1976 (NSW); Pimlico, near Wardell, *Moye*, 13.v.1994 (CANB).

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